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Mountain Climbing—The Easy Way

New Push-Button Nuclear Device

Pam Smith, Guardian of Canal Zone Health

Vol. 46 *No. 3*

There must be as the basis of every organization that lives, an altruistic spirit. No organization that is founded on selfishness can endure permanently, but an organization that is founded on altruism, on the desire to do for others rather than a desire to get for oneself, has an element of life that will make it long endure.

* * *

W. D. WILCOX, first president,
American Association of Engineers

Professional Engineer

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★

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M. E. McIVER, Editor

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Mountain Climbing, the Easy Way

Steve Lowell, Bellevue, Washington

The people who work and shop on the steep hillside of the downtown area of Tacoma, Washington, are doing their mountain climbing the easy way these days.

Four moving sidewalks are almost completed to help them move up and down between the three main business streets.

In Tacoma's early days, in order to be close to shipping and rail facilities, the central downtown business district developed up from the shore of Commencement Bay.

The side streets connecting the various levels were steep. Sidewalks often included handrails and cleated treads. A cable car system, similar to the famous San Francisco system, was devised. But as years went by, the cable car line suffered from increasing cost of operation and declining patronage as more and more people drove automobiles. Finally the cable cars were abandoned.

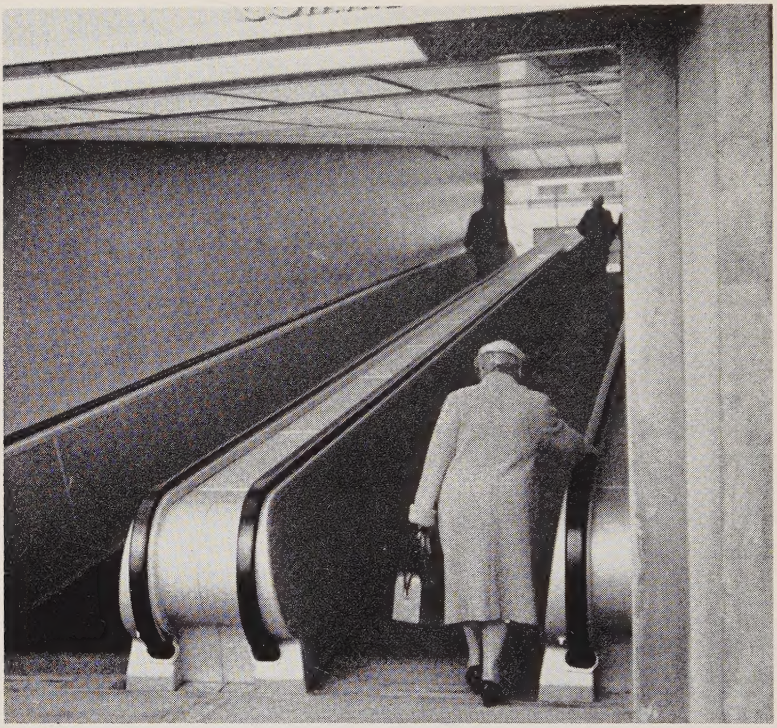
As the number of autos swelled, finding a place to park in the busy downtown area became a rapidly growing problem. People found they had to leave their cars outside the main business district and climb the steep hills on foot again.

In 1957, a committee of 250 residents was formed to find some solution to the problem. The committeemen figured the central business district was vital to everyone in the city and any improvement to it would benefit the entire city.

The committeemen believed moving walks would minimize the topographic barriers to pedestrian circulation in the business core; strengthen linkage between downhill offices and uphill retail areas; improve pedestrian flow by cutting through four long blocks, and more evenly distribute pedestrian circulation, which was channeled largely up and down one central hill street.

The committee recommended the ramps, and residents approved a bond issue in 1958 which included $870,000 to pay for the system.

Stephens-Adamson Manufacturing Company was picked for the equipment, Lea, Pearson and Richards, Tacoma architectural firm, was selected to draw the plans, and Jardeen Brothers and Montgomery Elevator Company were chosen to install the equipment.



A woman shopper gets on one of the moving sidewalks in Tacoma, Washington. These labor savers were built through city blocks in Tacoma's downtown business area to help people get up and down the steep hills between three main business streets. This is one of four sets which cut through long blocks of buildings. The ramps and handrails move about 90 feet a minute.

Two moving walks run from Pacific Avenue, the lowest level, up to Commerce Street, the middle level, and two other walks run from Commerce on up the hill to Broadway, the top level.

The ramps are in pairs, one strip moving uphill and the other down. They are 92 feet long and measure 53 inches between the moving handrails.

The width of the ribbed rubber belts is 42 inches.

The passengers ride up and down an incline of 12 degrees at about 90 feet a minute, and the ramps can move about 7,200 persons an hour.

Do the people of Tacoma appreciate the new walks?

Mrs. Bernadine Edrington, secretary of the Tacoma Real Estate Board, has to carry all the printing of the private organization from Pacific Avenue to Commerce Street. Says she:

"I like them, and I think people will use them."

She says she used to use store escalators to get from one level to another.

Army Private Robert Mastrude of Tacoma, home on leave, used the ramps and said, "I sure wasn't going to walk up the hill."

Charles T. Pearson uses the ramps. He said, "The feeling is that people will appear on these streets who ordinarily wouldn't come down town on business."

Earlier in the year, the first ramp was opened for one week for a civic celebration. It wasn't quite ready, but people wanted to see how it would work.

Pearson said not only did the ramp work fine, but "adjoining businesses did a bigger business than any time in their history."

Joel Durnin, an official in the Tacoma Department of Public Works, once owned a business on Commerce Street.

"You can see why I was interested," he said. "I saw more people on Commerce Street that first week than I'd seen in five years."

Nuclear Device Features Push-Button

New Five-Minute Method For Testing Density And Moisture Content

A new push-button nuclear device for making rapid measurements of the density and moisture in soils, aggregates and pavements has been developed.

The portable instrument, called the "Hydro-Densimeter," will permit inspectors (or contractors) to take a reading of both the moisture and density of material being compacted—in just 60 seconds. A series of three readings to verify uniformity of these conditions takes less than 5 minutes.

The new electronic device is expected to be in great demand by both contractors and inspectors on highway, airstrip and dam work and a host of other construction projects. The "Hydro-Densimeter" system differs from other such nuclear devices in that it is composed of only *two* components, instead of three, and employs a radio-active material the use of which does not require licensing by the Atomic Energy Commission.

Engineers field-testing the new method have reported that it takes inspectors only 1/7th as long to measure moisture and density on compaction work as the traditional rubber balloon, sand replacement, and oven-drying methods. The greatest economy in the new technique, however, is that the contractor can be given test findings on the spot, permitting him to advance his crews and equipment faster than he could if he were forced to wait for results from a laboratory.

The "Hydro-Densimeter" is composed of two units—a "probe" and a "counter." The probe, (8″ x 3″ x 14″), containing a radio-active material (radium-beryllium), is placed flat on the surface of the compacted area, material, or pavement, where it radiates fast neutron rays and gamma rays to the depth desired. The separate counter (11½″ x 11½″ x 11″) counts the number of radio-isotopes which are back-scattered from the material. The number of gamma rays recovered during a 60-second period inversely indicates the density of the material; and the number of fast neutrons reveals its moisture content.

The surface probe can measure density at depths of 2½ to 12 inches; moisture to a depth of 4 inches. (Another probe is also available which can be used to measure density at greater depths. It is a small cylindrical tube which can be lowered through a two-inch hole to the desired depth.)

The system's accuracy has been established by numerous tests comparing results obtained on the same spot with sand replacement, oven-drying and rubber balloon tests.

An additional advantage of the "Hydro-Densimeter" is that it is non-destructive, and as such, is particularly appropriate for testing of finished pavements and stabilized materials.

Major uses of the "Hydro-Densimeter" are:

1. Density measurements and compaction control in earthfill, sub base and base of highways, air strips, and earth dams.
2. Non-destructive testing of concrete pavements.
3. Control of stabilizer distribution in bitumen stabilized soils.
4. On-location determination of optimum moisture curves for compaction control.
5. Testing of compaction equipment.
6. Location of leaks in earth dams, canals, dikes, etc.
7. Checking of moisture content in sand at pre-mix concrete plants.
8. Measurement of density in stockpile materials (coal, grain, etc.) for accounting purposes.
9. Checking soil stability.
10. Location of pilings for bridges.
11. Evaluation of fills, backfills, and borrow pits in mines, earth embankments, highways, etc.
12. Checking for potential pavement failures.

The total system, including both components, and a built-in 6-volt power supply, and carrying cases, weighs 70 pounds. It can be operated, however, by one man. The counter can be left in a pick-up truck or station wagon and only the probe (weighing 10 lbs.) lifted in and out.

Operation requires no extensive training. It consists solely of placing the probe on the ground, plugging in the counter, holding a button down for 60 seconds, and recording the reading.

The new equipment is available from Viatec Division of Tellurometer, Inc., U. S. distributors of the well-known Tellurometer System for distance measurement, 206 Dupont Circle Building, Washington 6, D. C.

Over 923,000 fires occurred in the towns and cities of our nation last year. These fires damaged or destroyed over 310,000 homes. What is worse, 11,350 persons lost their lives as a result of fire in 1960.

PAM SMITH

GUARDIAN OF CANAL ZONE HEALTH

by Donald Robinson, M.D.

When John Palmer Smith, Jr., stepped off the boat in Santa Marta, Colombia, in 1927 he didn't receive the treatment he had expected: junior-grade engineer reporting to work on the construction gangs of United Fruit Company.

He was met at the boat by a company car, whisked to a lodge-like building and given rather luxurious quarters. It happened that a United Fruit Company Vice-President was named Palmer, and the local staff wasn't taking any chances with a name like John Palmer Smith, Jr.

"That evening," he recalls, "a straw colored Martinique 'gal' appeared at the door with some ice and asked if there was anything I wanted. The moon was full and she wore a bright sarong-like dress off her shoulders."

A pause. "But I asked for some writing paper and spent the evening writing a fifteen page letter home," Pam concluded.

The V.I.P. treatment came to an abrupt halt the next morning when the mail was opened. J. P. Smith, engineer, was bundled on a banana train and ridden out into the hinterland.

A number of significant things happened to Smitty, as some of his

Pam Smith (left) watches an assistant inspect for sand fly emergence from the soil, Canal Zone.

friends are bound to call him, while he was in Colombia, but these are not his claim to fame.

For the past twenty years as Chief of the Sanitation Division of the Panama Canal he has quietly maintained the work of Gorgas and LaPrince. Sometimes visitors, residents, or others forget that unless someone kept up the sanitation, yellow fever and malaria control, so historically and dramatically achieved, the Canal Zone would revert to a miasmic and disease-ridden swamp. John Palmer Smith, Jr., in a large measure is the man who keeps watch against this process.

His future began to take shape during the four years he was general foreman for the construction department of United Fruit in Santa Marta.

The most important event concerned Eva Flye. Her father, a resourceful Scotch-American, had established a coffee plantation in the mountains overlooking the city. When Mr. and Mrs. Flye offered Pam Smith their hospitality he gladly accepted it though entertainment was not scarce in the area. The Flyes' country home "Boliva" was delightful.

During the first few months of Pam's time in Colombia, Eva attended school away from the plantation, and he didn't meet her. He learned later that her sister had written to her, or so Eva claims, saying, "There's an engineer here now, and he seems to be just what we're looking for. We'll keep him bottled up until you get home."

Getting a wife was not the only portent of the future. He used to lie in bed and watch the centipedes, tarantulas and scorpions chase cockroaches in the thatch overhead. Dropping on the mosquito bar from time to time. Little did he realize then how intimate his life would be with insects and sanitation.

Sleeping with a pistol under his pillow, or shooting iguanas out of the trees to vary the diet, or sweating in the jungles was all part of life. But Pam must have liked the tropics, although he returned to the United States after four years at Santa Marta and didn't move south again for some time.

Smitty was born in Charleston, South Carolina, and graduated as a Civil Engineer from Clemson in 1923. He spent the first few years of his career building houses in Washington, D.C., before he went to South America, on the advice of a friend.

When he returned to the States with his wife and two children he found the country in a depression and it was during these years that his ultimate destiny took shape, though he probably failed to realize it. He headed a crew in malaria control in Hell Hole Swamp, second in size and terror only to Dismal Swamp.

"Things were so tough in those days all the stills had to close down," Pam remembers. "My axeman was an ex-bootlegger and knew the country like a book. At each hummock and creek he would recall nostalgically what stills had gone out of business in the area.

"But that wasn't the only oddity in our crew. My *front chain* man had a Master's Degree in Mechanical Engineering, and my *rear chain* man had a Master's in Electrical Engineering. We were all glad just to have a job."

Pam Smith moved into government work. As District Sanitary engineer for Third Corps area he took the first title that was to be his final destiny.

While economic recovery did slowly take place, Pam's growing family demanded that he look for a position with a promising future. And so it was that when he was offered a job with the Navy at Coco Solo Naval Base in the Canal Zone he and Eva decided he would accept it. They both liked the Canal Zone and are both bilingual. It seemed a good offer.

In less than two years he moved to a job with the Panama Canal, and shortly thereafter he received a call from General Stayer, the Health Director.

War had begun in Europe and the Canal Zone presented a likely target should the United States become involved. There was an urgent need to replace two sanitary engineers who had recently died, and General Stayer wanted to know if Pam would be interested.

Pam wasn't too sure that he was not getting himself into trouble after looking over the set-up because he was with the Health Department on a loan basis. How difficult it was became clear almost at once.

His first job consisted of looking into collection and disposal of refuse for the City of Panama. Panamanian President Anulfo Arias had been dickering with a German firm and had proposed building an incinerator near the stadium which was just across the boundary from the Zone and up wind from Gorgas Hospital. Pam soon decided a location like that was most ill advised and for three months studied this and other problems.

When he had his recommendations prepared he and Stayer went by appointment to the office of the Minister of Government and Justice. The atmosphere was one of confusion, with aides running in and out. After a wait the Minister apologized and had them ushered in.

"But we could see he didn't hear a word we said," Pam remembers.

That night a public announcement proclaimed Arias, who was in Cuba at the time, "out" and Minister of Government and Justice De La Guardia "in" as President of the Republic.

This was Pam's introduction to the vicissitudes of Panamanian politics. Since that time his job has tied him closely to sanitation in the Republic as well as the Canal Zone, and he takes Panamanian politics quite calmly.

During a revolution the streets of Panama City were piled high with rubble and broken bottles. The Health Officer at the time, General Rice, ordered the streets cleaned and garbage collected. At that time the Zone took care of Republic sanitation. This is no longer done. The Republic carries out its own sanitation procedures. Up to this time, however, there hadn't been a day missed in refuse collection in forty years.

"I don't want any Americans hurt," Rice said, "You go down and look around and see if it's safe."

Startled though he was, Pam took an assistant and they drove around the downtown area in the pitch black night.

"Not a soul on the streets; no police. All the houses shut up. But we just knew they were all standing by the shuttered windows with guns in their hands watching us," Pam says.

The Government Palace got a two-block girth, since this was the center of the fighting. They decided all could be done safely, so a fleet of trucks was released into the city at 2 A.M. They swarmed over the city and cleaned it up. By 8 A.M. all was clean and the trucks retired. The fighting recommenced.

And that was the schedule—fighting 10 A.M. 'til midnight and trash collecting throughout the early morning hours. Most of the revolutions keep to this schedule. At one point about ten years ago Panama had four presidents in one week.

Palmer Smith's knowledge of the Panamanians is almost as great as anyone in the Canal Zone Government because sanitation and disease know no boundaries and he has kept abreast of conditions in both political units.

Sanitation under his direction became a full fledged Division, and he now heads about 150 men. Their work maintains malaria and yellow fever control, ship inspection, housing and food handling sanitation and much more. Pam passes on all private building plans, advises anyone who asks on the proper methods of sanitation and frequently is called upon to give his advice to other tropical and sub-tropical countries.

Many problems face him daily. Among the most annoying to residents on the Atlantic side of the Zone is the sandfly. By studies, Mr. Smith calculates on good breeding nights one acre of land produces 2,000,000 sandflies (Culicoides). Their control includes diking to occlude salt water from the coastal swamps, or filling. Both are impractical in the vast areas involved. So Pam has been directing the seeding of the area with pelletized Dieldrin. The largest area yet tried with this method.

Having slept with a revolver under his pillow many years before, Pam's bravery has had tests through the years.

One day he and his small sons and daughter were out in the jungle collecting leaf mold for the garden. Down in a pit with a rake he found himself looking a seven foot Bushmaster in the eye. "Of course," he says, "my first inclination was to get the hell out of there, but I would have lost face with my sons, so I had to kill the snake and bring it up for them to see."

Because of his international reputation in the field of Sanitary Engineering Mr. Smith recently was offered a very interesting job in Pakistan. It would have been a challenge and he considered it carefully. In the end he offered to go for a few months as a consultant, but to let someone else take the assignment.

"I'm too close to the far bank of a rocky and turbulent stream to change horses now," he observed.

Eva and Pam Smith have four children. John Palmer the Third is a management supervisor for Container Corporation. Orlando F. Smith is an aircraft commander in S.A.C. Mary L. and Peter G. are both students, one in college, and the other soon to be.

It is impressive to watch the world beat a path to the Sanitation Division of the Canal Zone Government Health Bureau seeking advice and counsel. And the man who quietly directs its activities.

Every thirty-four seconds, somewhere in these United States, a fire breaks out. Every third fire damages or destroys someone's *home.* Take the advice of the National Board of Fire Underwriters: learn the basic facts of fire prevention, and *practice* them. Make *every* week fire prevention week!

Cornell Graduates

According to a recent bulletin of Cornell University, beginning salaries for graduating engineers at Cornell were four per cent higher than the previous year.

The engineering placement office, releasing its figures on this year's graduating seniors, reported that in the seven divisions of the college some 274 students received degrees. Of these, about 119 were placed through the office at salaries ranging from $444 to $833 a month, with a median of $566 a month for all graduates.

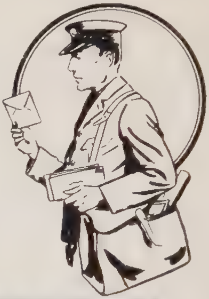
Most graduates were in mechanical engineering, which has the greatest enrollment, and of these 41 were placed in positions, with a median salary of $555. Next in number of graduates were electrical engineering with 59 and civil engineering with 44 graduates. Electrical and metallurgical engineering showed the greatest jump in median salaries over last year's figures.

All of the figures showed an increase over last year, reflecting the increasing engineering enrollment at Cornell and a steady, nationwide salary rise. Generally, salaries for Cornell engineers have gone up three to five per cent yearly for the last several years.

Reporting on salaries in the field, Donald H. Moyer, director of the office of student personnel for the College of Engineering, commented that significant changes have occurred during the 60's. Previously, engineers were hired at good salaries but reached a plateau midway in their careers, after which it was difficult to rise without entering some phase of administration.

Interesting
Letters Are Welcome

We invite our members to let us have their ideas, their suggestions, their constructive criticisms . . . that's the way we can build a better and more useful Society of Engineers.



MAYOR PROCLAIMS ENGINEERS WEEK

Mayor P. A. Christianson signs a proclamation designating Feb. 19-25 as National Engineers Week while engineers look on. Left to right: Jack Pearring, president of the Northern chapter, Idaho Professional Engineers; John Pointner, secretary; Ralph Donat, president of the N.I.J.C. student chapter, American Association of Engineers; D. H. Moser, head of the N.I.J.C. engineering department; Jim LePard, city engineer.

North Idaho Junior College Chapter

James Kirschner, Secretary of the North Idaho Junior College Chapter, A.A.E., wrote us interestingly of the chapter activities, especially mentioning an Engineers' Ball which they had. The main decoration of the hall was a scale model of Grand Coulee Dam, fifty feet long, five feet high, with running water over the center spillways.

"During Engineers' Week", writes Mr. Kirschner, "our club was invited by the Idaho State Professional Engineers to combine our activities at a dinner meeting. I enclose picture of the signing of the proclamation made by the mayor of Coeur d'Alene designating Engineers' Week." The group enjoyed a tour of the Kaiser Aluminum and Chemical Corporation at Trentwood, Washington, and a trip to the Bunker Hill and Sullivan Mining and Smelter Corporation, and a tour of the Coeur d'Alene installation of the General Telephone Company of the Northwest.

We wish the chapter lots of success in its activities this year. D. H. Moser is the sponsor of the group, and member of the American Association of Engineers.

Books for Engineers

McGraw-Hill Books

Design and Construction of Ports and Marine Structures by Alonzo DeF. Quinn, Chief Engr., Frederick Snare Corpn. $16.00

Handbook of Instrumentation and Controls by Howard P. Kallen, partner in Kallen & Lemelson, Consulting Engrs. $15.00

Analog Computation in Engineering Design, by A. E. Rogers, Application Engineer, Electronic Associates, Inc., and by T. W. Connolly, Marine Division of the Sperry Gyroscope Co. $16.00

Erecting Structural Steel, by Samuel P. Oppenheimer, Engaged in managerial work for a general contracting company. $9.50

National Electrical Code Handbook, 10th edition, revised by Frank Stetka, Elec. Field Engr., National Fire Protection Ass'n. $10.00

Electronics in Engineering, by W. Ryland Hill, Prof. of Electrical Engineering, Univ. of Washington. $8.00

Engineering Economics for Professional Engineers' Examinations, by Max Kurtz, Consulting structural engineer. $6.50

Successful Managerial Control by Ratio-Analysis, by Spencer A. Tucker, Partner, Martin & Tucker. $11.00

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Warehouse Operations, Planning and Management, Andrew J. Briggs, Service Bldg. Supt., May & Co. $8.50

Digital Applications of Magnetic Devices, by Senior Editor, Albert J. Meyerhoff, Member of the Technical staff of Burroughs Corporation. $14.00

Theory, electrical design, and logical design of the most representative forms of digital magnetic circuits from a single, integrated approach.

Digital Computers and Nuclear Reactor Calculations, by Ward C. Sangren, Chief of Math. and Computing at John Jay Hopkins Lab. for Pure and Applied Science, Gen. Atomic Div. of Gen. Dynamics Corp. $8.50

The Physical Chemistry of Steelmaking, by John F. Elliott, Associate Prof. of Metallurgy at M.I.T. $15.00

High-Frequency Magnetic Materials, by W. J. Polydoroff. $9.00

Management Control Systems, by Malcolm & Rowe, Donald G. Malcolm, V.P., of Operations Research Inc., Western Division, Alan J. Rowe, Mgr. of Management Control Systems Research at System Development Corp. $7.25

The Proceedings of a Symposium held at the System Development Corp., Santa Monica, Cal., July, 1959.

Pergamon Press

Metallic Corrosion Inhibitors, by I. N. Putilova, S. A. Balezin, and V. P. Barannik, translated from the Russian by G. Ryback, Edited by E. Bishop. $10.00

Nuclear Forces and the Few-Nucleon Problem, by T. C. Griffith and E. A. Power, Two Volumes. $30.00 set

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Determination of the Mechanical and Technological Properties of Metals, by B. M. Gliner. $8.50

Agard Aeronautical Multilingual Dictionary, by G. H. Frenot & S. Holloway. $20.00

Thermal Reactor Theory, (translated from Russian by J. B. Sykes) by A. D. Galanin. $15.00

Electronic Computers, Principles and Applications, by T. E. Ivall, Second Edition. Philosophical Library. $15.00

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International Dictionary of Applied Mathematics, by W. F. Freiberger, Editor-in-Chief, Associate Professor of Applied Mathematics, Brown University. $25.00

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Magnetic Control of Industrial Motors, Part I: A-C Control Devices and Assemblies, by Gerhart W. Heumann. $9.00

Philosophical Library Inc.

Engineering Management, by Struan A. Robertson, Battersea Polytechnic, London, S. W. 11. $10.00

Modern Electronic Components, by G. W. A. Dummer, M.B.E., M.I.E.E., Sen. Member, I.R.E., Head of Components Research, Development, and Testing at the Royal Radar Establishment, Ministry of Supply. $15.00

Dictionary of Mechanical Engineering, by Alfred Del Vecchio, Assoc. Professor of Mechanical Engr. $6.00

Prentice-Hall, Inc.

Modern Flight Dynamics by W. Richard Kolk, Systems Engineer in United Aircraft Corpn. 1961. $10.00

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Numerical Methods for Science & Engineering by Ralph G. Stanton, Prof. of Mathematics, University of Waterloo, Ontario. 1961. $9.00

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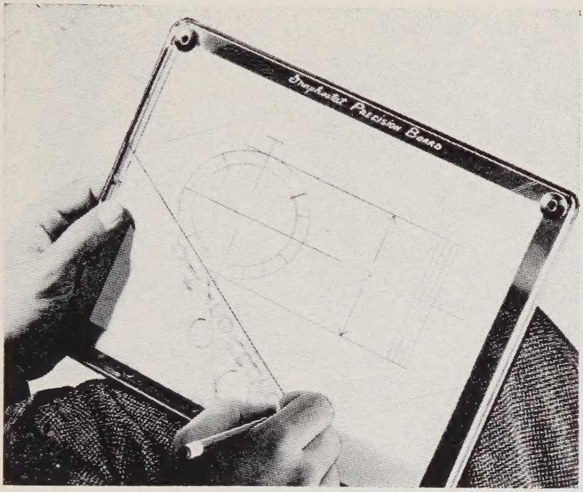
Illinois Engineering Council

Governor Kerner has vetoed H.B. 1429 which would have allowed the Corporate Practice of Engineering. He did, however, approve S.B. 804 which authorized the formation of Professional Associations, as distinguished from either a partnership or a corporation, by associating themselves for the purpose of rendering professional services and dividing the gains therefrom as stated in articles of association; provided that no professional association organized pursuant to this Act shall engage in more than one type of professional service. The Act provides that all members of the association shall be licensed to perform the type of professional service for which the association is formed.

A professional association may adopt a name consisting of the full or last name of one or more of the associates, followed by the term "associated" or "association" or "and associates" or the abbreviation "assoc."

The next annual meeting of the Council will be held on December 9, at the Western Society of Engineers, at which time the following slate of officers for 1962 will be presented: President, J. P. Gnaedinger; 1st Vice President, A. L. R. Sanders; 2nd Vice President, G. L. Farnsworth, Jr.; Secretary-Treasurer, N. A. Miller.



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